

# SUREKEY EXAMINATIONS BOARD



"Don't speak for Quality, Let Quality Speak for itself"

**2024**



**MATHEMATICS TARGET SERIES**  
**OFFICIAL MARKING GUIDE**

### SECTION A: 40 MARKS

Answer **all** questions in this Section  
Questions **1** to **20** carry two marks each

1. Workout: 
$$\begin{array}{r} 3 \ 4 \\ \times \ 2 \\ \hline 6 \ 8 \end{array}$$

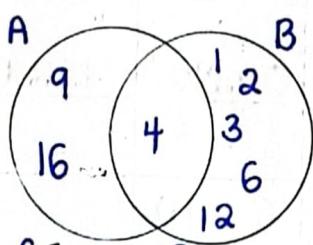
2. Write in numerals: "one hundred one thousand, one".

Thousands	Units
101	001

101,001

3. Given that  $A = \{\text{all square numbers between } 1 \text{ and } 25\}$  and  $B = \{\text{all factors of } 12\}$ .

Find  $n(A - B)$



$$F_{12} = 12 \div 1 = 12 \\ 12 \div 2 = 6 \\ 12 \div 3 = 4$$

$$F_{12} = \{1, 2, 3, 4, 6, 12\}$$

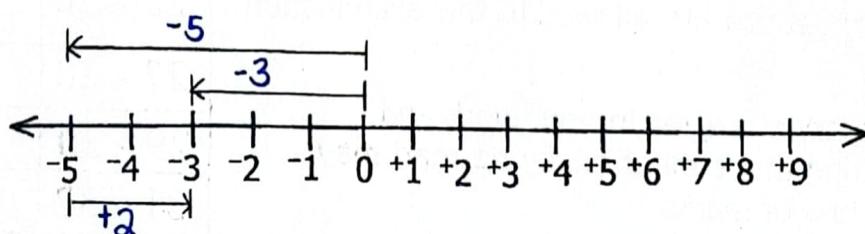
$$A = \{4, 9, 16\}$$

$$B = \{1, 2, 3, 4, 6, 12\}$$

$$A - B = \{9, 16\}$$

$$n(A - B) = 2$$

4. Use the number line below to work out:  $-3 - -5$



$$\therefore -3 - -5 = +2$$

5. Seven counters numbered 1, 3, 4, 5, 8, 9 and 10 are placed in a box. If a counter is drawn out at random, what is the probability that it is a counter with a cubic number?

$$\text{Probability} = \frac{n(D \cdot C)}{n(T \cdot C)}$$

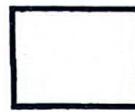
$$n(D \cdot C) = \{1, 8\}$$

$$= 2$$

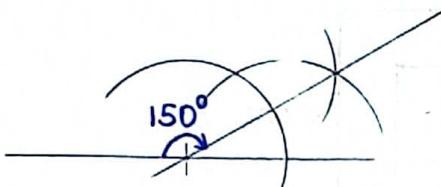
$$n(T \cdot C) = \{1, 3, 4, 5, 8, 9, 10\}$$

$$= 7$$

$$\text{Probability} = \frac{2}{7}$$



6. Using a ruler, a pencil and a pair of compasses only, construct an angle of  $150^\circ$  in the space provided below.



7. Given that  $\square$  represents 12 of the boys in P.7, find the number of boys that are in the P.7 class if their total is represented by  $\bigoplus \bigoplus$ .

1 quarter rep 12 boys

$$\begin{array}{r|l} 12 & \\ \times 7 & \\ \hline 84 & \end{array}$$

7 quarters rep.  $7 \times 12$  boys

$$\begin{array}{r|l} 12 & \\ \times 7 & \\ \hline 84 & \end{array}$$

84 boys are in the P.7 class.

8. Simplify:  $(a - 2) - (1 - 3a)$ .

$$(a - 2) - (1 - 3a)$$

$$a - 2 - 1 + 3a$$

$$(a + 3a) - 2 - 1$$

$$\underline{4a - 3}$$

9. The time on a 12-hour clock is 25 minutes to midnight. Express this time on a 24-hour clock.

Time in 12-hour clock

11 : 35 p.m.

Time in 24-hour clock.

Hours Minutes

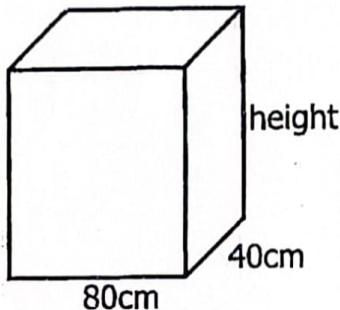
12 : 00

+ 11 : 35

23 : 35

11:35 p.m. → 23:35 hours

10. A tap takes 4 hours to fill the tank below at a rate of 40 litres per hour.



Find the height of the tank.  
Capacity of the tank

1 hour → 40 litres

4 hours →  $(40 \times 4)$  litres

4 hours → 160 litres

Volume of the tank

$$\begin{aligned} \text{Volume} &= \text{Capacity} \times 1000\text{cm}^3 \\ &= 160 \times 1000\text{cm}^3 \\ &= 160,000\text{cm}^3 \end{aligned}$$

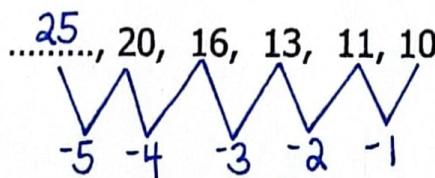
Height of the tank

$$\begin{aligned} L \times W \times H &= \text{Volume} \\ 80\text{cm} \times 40\text{cm} \times h &= 160,000\text{cm}^3 \end{aligned}$$

$$\begin{aligned} 80\text{cm} \times 40\text{cm} \times h &= 160,000\text{cm}^3 \\ 80\text{cm} \times 40\text{cm} &= 80 \times 40 \\ h &= \frac{160,000}{3200} \\ h &= 50 \text{ cm} \end{aligned}$$



11. Find the missing number in the sequence below.



$$10 - 11 = -1$$

$$11 - 13 = -2$$

$$13 - 16 = -3$$

$$16 - 20 = -4$$

Let the missing no. be a

$$a - 5 = 20$$

$$a - 5 + 5 = 20 + 5$$

- |     |   |  |
|-----|---|--|
| 12. | Kante took 15 seconds to run 100 metres. What was his speed in kilometres per hour? | Speed = $\frac{1}{10} \text{ km} \div \frac{15 \text{ hr}}{3600}$<br>= $\frac{1}{10} \text{ km} \times \frac{3600}{15 \text{ hr}}$<br><u><u>= 24 \text{ km/hr}</u></u> |
|     | <u>Distance in km</u>   | <u>Time in hours</u>   |
|     | $1000 \text{ m} = 1 \text{ km}$   | $3600 \text{ sec} = 1 \text{ hour}$  |
|     | $1 \text{ m} = \frac{1}{1000} \text{ km}$   | $1 \text{ sec} = \frac{1}{3600} \text{ hour}$  |
|     | $100 \text{ m} = \left( \frac{1}{1000} \times 100 \right) \text{ km}$               | $15 \text{ sec} = \left( \frac{1}{3600} \times 15 \right) \text{ hour}$  |
|     | $100 \text{ m} = \frac{1}{10} \text{ km}$   | $15 \text{ sec} = \frac{15}{3600} \text{ hour}$  |
| 13. | Find the value of n in the figure below.  |  |
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16. A man's stride is 75cm. How many strides does he take to cover a distance of 9 metres?

$$\text{Number of strides} = \frac{\text{Distance}}{\text{Each stride}} = \frac{60}{75 \text{ cm}}$$

Distance in cm

$$1 \text{ m} = 100 \text{ cm}$$

$$9 \text{ m} = 9 \times 100 \text{ cm}$$

$$9 \text{ m} = 900 \text{ cm}$$

$$\text{Number of strides} = \frac{900 \text{ cm}}{75 \text{ cm}}$$

$$= \frac{12}{5}$$

$$= \frac{60}{5}$$

$$= 12$$

He takes 12 strides to cover a distance of 9 metres.

17. Deborah scored the following marks in PLE Mock Examinations.

MTC	SST	SCI	ENG
90	70	60	80

If these marks are to be represented on a pie chart, what angle would represent Mathematics.

$$\text{Total marks} = 90 + 70 + 60 + 80 = 300 \text{ marks}$$

$$70$$

$$60$$

$$90$$

$$+ 80$$

$$\underline{300}$$

Mathematics

$$\frac{90}{300} = \frac{3}{10} \times 360^\circ$$

$$3 \times 36^\circ$$

$$36^\circ$$

$$\times 3$$

$$\underline{108^\circ}$$

$$108^\circ$$

108° would represent Mathematics.

18. A trader sold six calves for Sh. 1,260,000. If the trader made a profit of Sh. 180,000, how much money did he pay for each calf?

$$\text{Buying price} = \text{Selling price} - \text{Profit}$$

$$\text{sh. } 1,260,000$$

$$-\text{sh. } 180,000$$

$$\text{sh. } 1,080,000$$

$$= \text{sh. } 1,080,000$$

Amount paid for each calf.

$$\text{sh. } \frac{180,000}{1,080,000}$$

$$\underline{\$}$$

$$\text{sh. } 180,000$$

He paid sh. 180,000 for each calf.

19. Simplify:  $\frac{1}{3} - \frac{7}{18} + \frac{2}{9}$

$$\begin{aligned}\frac{1}{3} - \frac{7}{18} + \frac{2}{9} &= \left(\frac{1}{3} + \frac{2}{9}\right) - \frac{7}{18} = \frac{3}{6} \\ \text{LCD} &= 18 \\ &= \frac{(6+4)-7}{18} \\ &= \frac{10-7}{18} \\ &= \frac{3}{18}\end{aligned}$$

20. Belon withdrew 100 ten thousand shillings notes numbered consecutively up to AP534300. Find the registration number of the first note.

Registration number for first note

Let the number be  $a$ .

$$(\text{Last note} - \text{First note}) + 1 = \text{No. of notes}$$

$$\begin{aligned}(\text{AP534300} - a) + 1 &= 100 \\ (\text{AP534300} - a) + 1 - 1 &= 100 - 1 \\ \text{AP534300} - a &= 99 \\ \text{AP534300} - a &= 99 + a \\ \text{AP534300} &= 99 + a \\ \text{AP534300} - 99 &= 99 - 99 + a\end{aligned}$$

$$\begin{array}{r} 299 \\ - 99 \\ \hline 200 \\ \text{AP534201} = a \\ a = \text{AP534201} \end{array}$$



### SECTION B: 60 MARKS

Answer **all** questions in this section

Marks for each question are indicated in brackets.

21. The sum of 3 consecutive odd numbers is 69. If the number after the third number is  $y$ . Find the numbers. (04 Marks)

1st no.	2nd no.	3rd no.	Sum
$y-6$	$y-4$	$y-2$	69

$$y-2 + y-4 + y-6 = 69$$

$$(y+y+y)-2-4-6 = 69$$

$$3y - 12 = 69$$

$$3y - 12 + 12 = 69 + 12$$

$$3y = 81$$

$$\frac{3y}{3} = \frac{81}{3}$$

$$\frac{3y}{3} = \frac{81}{3}$$

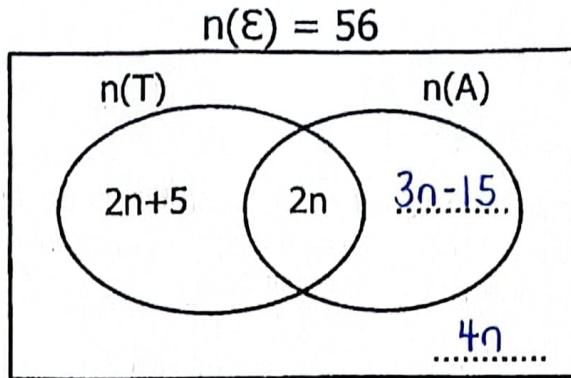
$$y = 27$$

1st no.	2nd no.	3rd no.		
$y-6$	$y-4$	$y-2$	$\frac{27}{-6}$	$\frac{27}{-4}$
$27-6$	$27-4$	$27-2$	$\frac{21}{-6}$	$\frac{27}{-4}$
21	23	25		7

**Turn Over**

22. In a village of 56 farmers,  $(2n+5)$  farmers grew tomatoes (T) only,  $(3n-15)$  farmers grew Apples (A) only,  $2n$  farmers grew both Tomatoes and Apples while the number of farmers who didn't grow any of the two crops was twice the number of those who grew both tomatoes and apples.

- (a) Complete the Venn diagram below using the above information. (02 Marks)



$$n(T \cup A)' = 2n + 2n \\ = 4n$$

- (b) Find the value of  $n$ . (02 Marks)

$$\begin{aligned} 2n+5 + 2n + 3n - 15 + 4n &= 56 \\ (2n+2n+3n+4n)+5-15 &= 56 \\ 11n-10 &= 56 \\ 11n-10+10 &= 56+10 \\ 11n &= 66 \\ \frac{11n}{11} &= \frac{66}{11} \\ n &= \underline{\underline{6}} \end{aligned}$$

- (c) How many farmers grew only one type of crop? (02 Marks)

$$\begin{aligned} n(T) \text{ only} + n(A) \text{ only} \\ (2n+5) + (3n-15) \\ [(2 \times 6) + 5] + [(3 \times 6) - 15] \\ (12+5) + (18-15) \\ 17 + 3 \end{aligned}$$

20 farmers

20 farmers grew only one type of crop.



23. (a) Given that  $p = 5$ ,  $q = 0$  and  $r = 3$ . Find the value of  $pq + pr$ . (02 Marks)

$$\begin{aligned}
 pq + pr &= (pxq) + (pxr) \\
 &= (5 \times 0) + (5 \times 3) \\
 &= 0 + 15 \\
 &= \underline{\underline{15}}
 \end{aligned}$$

(b) If  $\frac{2}{3}(n+1) = \frac{1}{2}(n+2)$ , find the value of  $n$ . (03 Marks)

$$\begin{aligned}
 \frac{2}{3}(n+1) &= \frac{1}{2}(n+2) & 4n+4-4 &= 3n+6-4 \\
 \left(\frac{2}{3} \times n\right) + \left(\frac{2}{3} \times 1\right) &= \left(\frac{1}{2} \times n\right) + \left(\frac{1}{2} \times 2\right) & 4n &= 3n+2 \\
 \frac{2n}{3} + \frac{2}{3} &= \frac{n}{2} + \frac{1}{2} & 4n - 3n &= 3n - 3n + 2 \\
 \left(\frac{2n}{3} \times 6\right) + \left(\frac{2}{3} \times 6\right) &= \left(\frac{n}{2} \times 6\right) + \left(\frac{1}{2} \times 6\right) & n &= \underline{\underline{2}} \\
 (2n \times 2) + (2 \times 2) &= (n \times 3) + (1 \times 6) \\
 4n + 4 &= 3n + 6
 \end{aligned}$$

24. The mean age of a family of 4 people is 24 years. The father's age is 38 years and the mother is 4 years younger than the father. How old is the son if he is 2 years older than the daughter? (04 Marks)

Total age of the family	Father	Mother	Father and mother	Children's age
$(4 \times 24)$ years $  \begin{array}{r}  4 \times 24 \\  \hline  96  \end{array}  $ years	38 years	$(38-4)$ years 34 years	$  \begin{array}{r}  38 \\  + 34 \\  \hline  72  \end{array}  $ years	9 6 - 1 2 <u><u>2 4</u></u> years

Son's age

Let the son's age be  $a$ .

Son	Daughter	Total
$a$	$a-2$	24 years

$$\begin{aligned}
 a + a - 2 &= 24 \\
 2a - 2 &= 24 \\
 2a - 2 + 2 &= 24 + 2 \\
 2a &= 26 \\
 \frac{2a}{2} &= \frac{26}{2}
 \end{aligned}$$

$a = 13$   
The son is 13 years old.



25. A bus leaves Nabong at 11:45a.m and arrives in Kitagata at 3:15p.m.  
The bus travels at an average speed of 72km/h.

(a) Calculate the distance between Nabong and Kitagata. (03 Marks)

$$\text{Distance} = \text{Speed} \times \text{Time}$$

$$\text{Speed} = 72 \text{ km/hr}$$

Time

Arrival time in 24 hour clock

Hours Minutes

$$12 : 00$$

$$+ 3 : 15$$

$$\hline 15 : 15$$

15:15 hours

Time taken

Hours	Minutes	
14	15	60
+ 5	: + 5	+ 15
- 11	: 45	75
	3 : 30	

3 hours and 30 mins

$$\text{Distance} = 72 \text{ km/hr} \times 3\frac{30}{60} \text{ hr}$$

$$= \frac{72}{1} \text{ km} \times \frac{210}{60} \text{ hr}$$

$$= 12 \text{ km} \times 21$$

$$\begin{array}{r} 12 \\ \times 21 \\ \hline 12 \\ + 24 \\ \hline 252 \\ = 252 \text{ km} \end{array}$$

(b) If the bus uses diesel at a rate of 2 litres for every 24km and diesel costs Sh.5,300 per litre, how much money is spent on diesel for the journey from Nabong to Kitagata? (02 Marks)

Number of litres used	Amount needed
24km → 2 litres	sh. 5300 × 21
1 km → $\frac{2}{24}$ litres	53
252km → $\frac{2}{24} \times 252$ litres	$\begin{array}{r} \times 21 \\ \hline 153 \\ + 106 \\ \hline 1113 \end{array}$
252km → 21 litres	sh. 111300

26. There are 2700 people in a village. 60% of them are males and  $\frac{3}{5}$  of the females are girls.

(a) Find the number of males in the village.

(02 Marks)

$$60\% \times 2700$$

$$\begin{array}{r} 60 \\ 100 \\ \times 2700 \\ \hline 1620 \end{array}$$

$$6 \times 270$$

$$\begin{array}{r} 4 \\ 270 \\ \times 6 \\ \hline 1620 \end{array}$$

1620 males

(b) Work out the ratio of girls to males in the village. (02 Marks)

Females	$\left( \frac{3}{5} \times 1080 \right) \text{ girls}$	$\frac{324}{648}$	$\frac{18}{405}$
$2\frac{6}{10}0$	$\frac{6}{10}0$	$\frac{648}{1620}$	$\frac{405}{45}$
$-1\frac{6}{10}0$	$1\frac{6}{10}0$	$810$	$45$
$\underline{-1\frac{6}{10}0}$	$\underline{females}$	$162$	$18$
Girls	$\frac{648 \text{ girls}}{\text{Ratio}}$	$\frac{324}{810}$	$\frac{45}{405}$
$\left( \frac{3}{5} \text{ of } 1080 \right) \text{ girls}$	$648 : 1620$	$\frac{2}{5}$	$2:5$



27. The table below shows how the bank buys and sells foreign currency.

Currency	Buying in Ugsh.	Selling in Ugsh.
1 US dollar (\$)	3,600	3,700
1 Pound Sterling (£)	4,650	4,700

(a) Abel came to Uganda with \$450 and converted it to Uganda Shillings. How much did he get from the bank? (02 Marks)

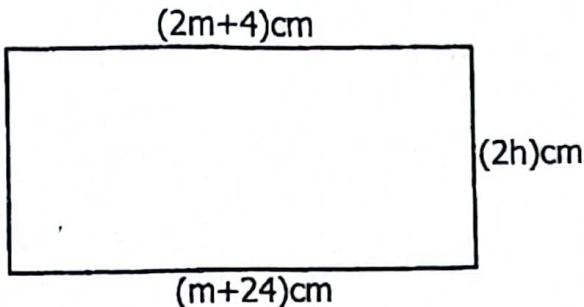
$$\begin{aligned} 1 \text{ US dollar} &= \text{Ug.sh. } 3600 \\ 450 \text{ US dollars} &= \text{Ug.sh. } 3600 \times 450 \\ 450 \text{ US dollars} &= \text{Ug.sh. } 1620000 \\ \text{He got Ug.sh. } 1620000. & \end{aligned}$$

$$\begin{array}{r} 36 \\ \times 45 \\ \hline 180 \\ +144 \\ \hline 1620 \end{array}$$

(b) During his stay in Uganda, he spent Ug.sh. 1,291,000 and then converted the remaining shillings to Pound Sterling. How many Pound Sterling did he get? (03 Marks)

Remaining amount	$\text{Ug.sh. } 329,000 = \left( \frac{1}{4700} \times 329,000 \right) \text{ £}$
sh. 1,291,000	
-sh. 1,291,000	
sh. 329,000	$\text{Ug.sh. } 329,000 = 70 \text{ £}$
<u>Ug.sh. 329,000 to Pound Sterling</u>	<u>He got 70 Pound Sterling.</u>
$\text{Ug.sh. } 4700 = 1 \text{ £}$	
$\text{Ug.sh. } 1 = \frac{1}{4700} \text{ £}$	

28. The figure below shows a rectangular metallic sheet which was curved to form a cylindrical tank of volume  $1540\text{cm}^3$ . Use it to answer the questions that follow.



- (a) Calculate the radius of the cylinder formed after curving the metallic sheet. (Use  $\pi$  as  $\frac{22}{7}$ ) (03 Marks)

Value of m

$$(m+24)\text{cm} = (2m+4)\text{cm}$$

$$m+24 = 2m+4$$

$$m-m+24 = 2m-m+4$$

$$24 = m+4$$

$$24-4 = m+4-4$$

$$20 = m$$

$$m=20$$

$$m=20$$

Circumference

$$(m+24)\text{cm} = (20+24)\text{cm}$$

Radius

$$2\pi R = \text{Circumference}$$

$$2 \times \frac{22}{7} \times R = 44\text{cm}$$

$$\frac{44}{7}R = 44\text{cm}$$

$$\frac{1}{7} \times \frac{44}{7}R = \frac{44}{7}\text{cm} \times \frac{1}{44}$$

$$R = 7\text{cm}$$

Radius = 7cm

- (b) Find the value of h.

(02 Marks)

$$\pi R^2 H = \text{Volume}$$

$$\frac{22}{7} \times 7\text{cm} \times 7\text{cm} \times 2h\text{cm} = 1540\text{cm}^3$$

$$\frac{22}{7} \times \frac{1}{7}\text{cm} \times 7\text{cm} \times 2h\text{cm} = 1540\text{cm}^3$$

$$22\text{cm} \times 7\text{cm} \times 2h\text{cm} = \frac{1540\text{cm}^3}{220}$$

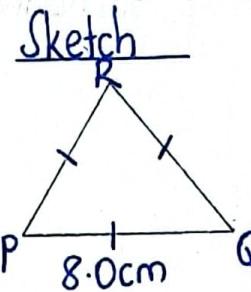
$$\frac{22\text{cm} \times 7\text{cm} \times 2h\text{cm}}{22\text{cm} \times 7\text{cm} \times 7\text{cm}} = \frac{1540\text{cm}^3}{22\text{cm} \times 7\text{cm} \times 7\text{cm}}$$

$$2h = \frac{10}{22}$$

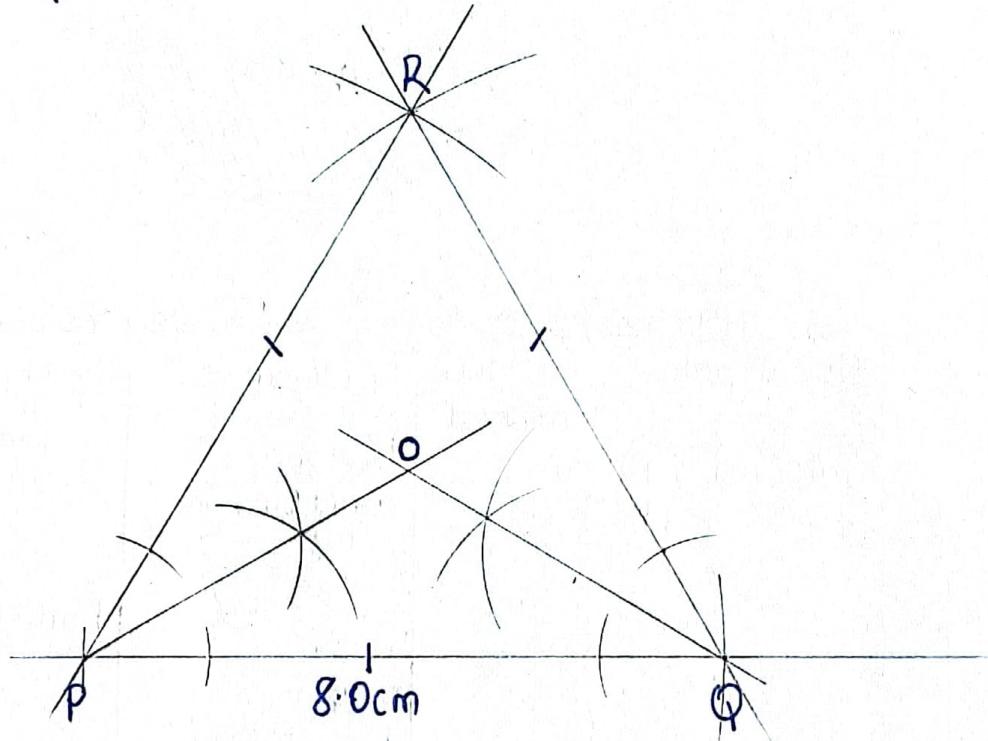
$$\frac{2h}{2} = \frac{10}{22}$$

$$h = 5$$

29. (a) With the help of a ruler, a pencil and a pair of compasses only, construct triangle PQR where  $PQ = QR = PR = 8.0\text{cm}$ . (03 Marks)



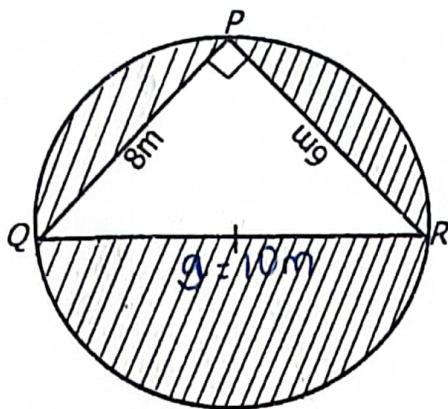
Accurate



- (b) Bisect angles PQR and QPR and let the bisectors meet at point O. (02 Marks)

- (c) Measure angle POQ.  $120^\circ$ ..... (01 Mark)

30. Daniel wanted to erect a triangular hut PQR on his circular plot of land using poles. He placed the poles at intervals of 120cm and the remaining parts of the circular plot are shaded as shown in the diagram below.



(a) How many poles did Daniel use to erect the triangular hut?

No. of poles = $\frac{\text{Distance}}{\text{Interval}}$	$g = 10 \text{ cm}$	<u>No. of poles</u> (03 Marks)
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$$\text{Interval} = 120 \text{ cm}$$

$$\emptyset c^2 = a^2 + b^2$$

$$g^2 = 8^2 + 6^2$$

$$g^2 = 64 + 36$$

$$g^2 = 100$$

$$\sqrt{g^2} = \sqrt{100}$$

$$\sqrt{g^2} = \sqrt{2^2 \times 5^2}$$

$$g = 2 \times 5$$

2	100
2	50
5	25
5	5
	1

$$\frac{\text{Distance}}{10 \text{ m} + 6 \text{ m} + 8 \text{ m}}$$

$$\begin{array}{r} 10 \\ 6 \\ + 8 \\ \hline 24 \end{array}$$

$$24 \text{ m}$$

$$1 \text{ m} = 100 \text{ cm}$$

$$24 \text{ m} = 24 \times 100 \text{ cm}$$

$$24 \text{ m} = 2400 \text{ cm}$$

$$\begin{array}{r} 20 \\ 2400 \text{ cm} \\ + 20 \text{ cm} \\ \hline \end{array}$$

20 poles

Daniel used 20 poles.

(b) Work out the area of the shaded part of the circular plot that was not occupied by the hut. (Use  $\pi$  as 3.14) (03 Marks)

$$\text{Area unoccupied} = \text{Area of circular plot} - \text{Area of triangular hut}$$

Area of circular plot

$$\text{Area} = \pi R^2$$

$$= 3.14 \times \frac{10 \text{ m}}{2} \times \frac{10 \text{ m}}{2}$$

$$= \frac{314}{100} \times \frac{10}{2} \times \frac{10}{2}$$

$$= \frac{314}{100} \times 5 \text{ m} \times 5 \text{ m}$$

$$= \frac{1850}{100} \text{ m}^2$$

$$= 18.5 \text{ m}^2$$

Area of triangular hut

$$\text{Area} = \frac{1}{2} \times b \times h$$

$$= \frac{1}{2} \times 6 \text{ m} \times 8 \text{ m}$$

$$= 3 \text{ m} \times 8 \text{ m}$$

$$= 24 \text{ m}$$

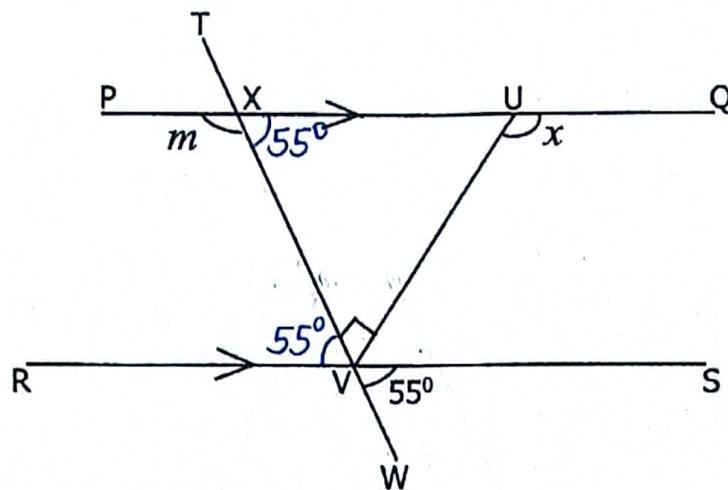
Area unoccupied

$$78.5 \text{ m}^2$$

$$- 24.0 \text{ m}^2$$

$$54.5 \text{ m}^2$$

31. In the figure below, PQ is parallel to RS. Angle SWV =  $55^\circ$  and UV is perpendicular to TW. Study it and answer the questions that follow.



Find the size of;

(a) angle  $m$ .

(02 Marks)

$$\begin{aligned} m + 55^\circ &= 180^\circ \text{ (Co-interior angles)} \\ m + 55^\circ - 55^\circ &= 180^\circ - 55^\circ \\ 180^\circ \\ - 55^\circ \\ \hline 125^\circ \\ m = 125^\circ \end{aligned}$$

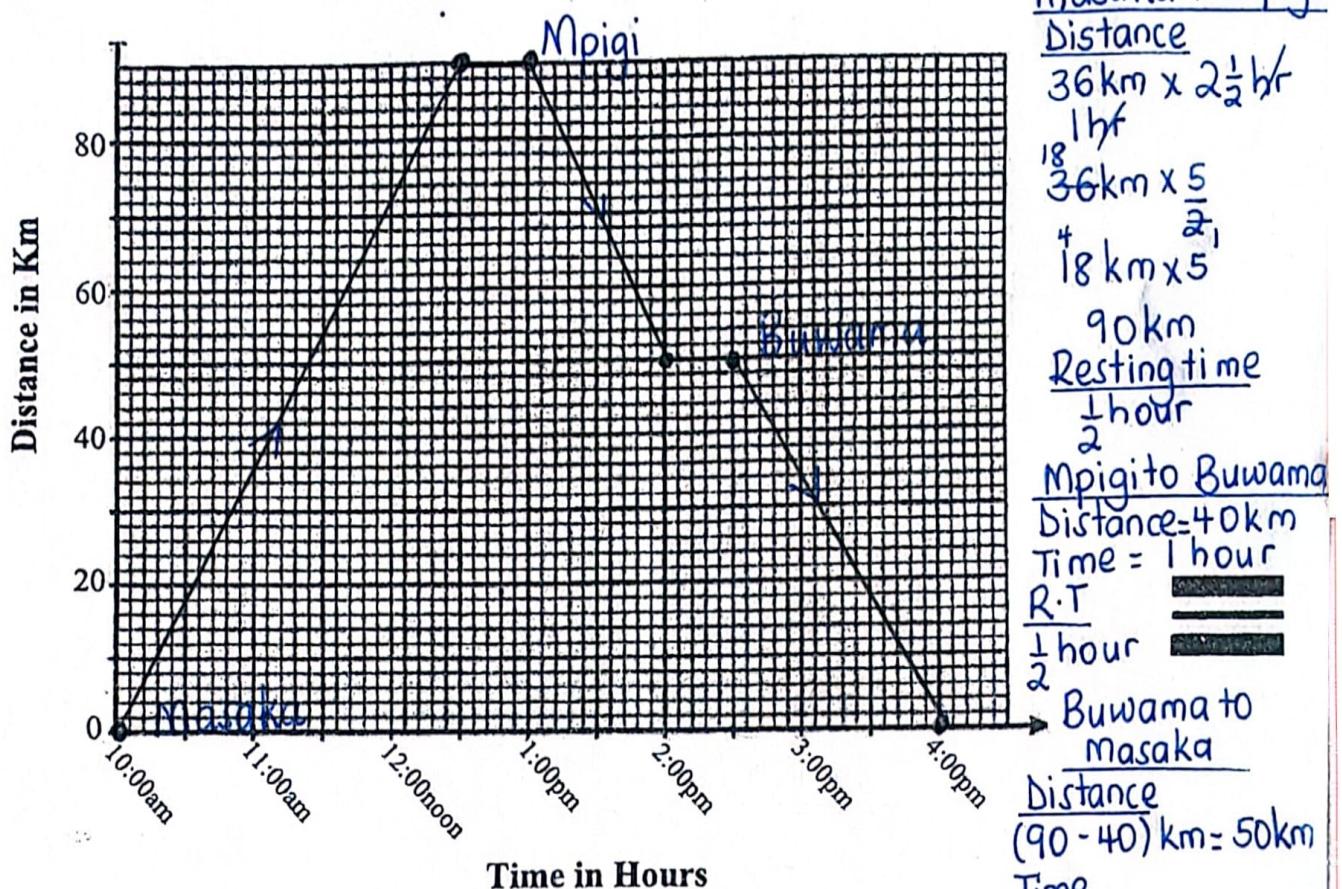
(b) angle  $x$ .

(02 Marks)

$$\begin{array}{r|l} x = 55^\circ + 90^\circ & | \begin{array}{r} 55^\circ \\ + 90^\circ \\ \hline 145^\circ \end{array} \\ \hline x = 145^\circ & \end{array}$$

32. Okello left Masaka at 10:00am in a tricycle driving at a steady speed of 36km/h directly to Mpigi for  $2\frac{1}{2}$  hours. He rested for half an hour and went back to Masaka. On his return journey, he drove for 60 minutes reaching Buwama where he rested for another 30 minutes. He then covered the remaining journey back to Masaka in  $1\frac{1}{2}$  hours.

- (a) Show Okello's journey on the travel graph below. (03 Marks)



- (b) At what time did Okello reach Mpigi? (01 Mark)

At 12:30p.m.

- (c) Calculate Okello's average speed for the whole journey. (02 Marks)

$$\begin{aligned}\text{Average speed} &= \frac{\text{Total distance}}{\text{Total time}} \\ &= \frac{90 \text{ km} \times 2}{6 \text{ hours}} \\ &= \frac{180}{6} \text{ km} \\ &= 30 \text{ km/hr}\end{aligned}$$

